CLAIMS

1. A two-dimensional photonic crystal, wherein on a plane in which four adjoining unit lattices are arranged so as to have one angle in common with the unit lattice being a rectangle whose shorter side X1 has a length of x1 and whose longer side Y1 has a length of y1, first dielectric regions each being columnar and having a rectangular cross section whose shorter side X2 has a length of x2 and whose longer side Y2 has a length of y2 are disposed on said shorter sides X1 and said longer sides Y1 of each rectangular unit lattice,

characterized in that said first dielectric region is arranged so that the midpoint of said shorter side X1 and the midpoint of said longer side Y1 and the center of said rectangular cross section substantially coincide,

said longer sides Y2 of each said first dielectric region are substantially parallel to each other,

the ratio of x1:y1 equals 1:substantially $\sqrt{3}$, and

the ratio of x1:x2:y2 equals 1:0.133:0.48 to 1:0.158:0.58.

2. The two-dimensional photonic crystal according to claim 1, characterized in that said first dielectric region is arranged so that said longer side Y2 of the rectangular cross section is substantially parallel to said longer side Y1 of the unit lattice.

3. The two-dimensional photonic crystal according to claim 1 or 2, characterized in that the ratio of x1:x2:y2 equals 1:0.135:0.48 to 1:0.150:0.54.

4. The two-dimensional photonic crystal according to claim 1 or 2, characterized in that the ratio of x1:x2:y2 equals 1:0.135:0.52 to 1:0.140:0.54.

5. The two-dimensional photonic crystal according to claim 1 or 2, characterized in that the size of said rectangular cross section is 0.10 μm × 0.37 μm, or greater.

6. The two-dimensional photonic crystal according to claim 1, characterized in that said photonic crystal comprises a second dielectric region surrounding said first dielectric region and having a dielectric constant different from that of said first dielectric region, one of said first dielectric region and said second dielectric region is formed from a dielectric material, and the other is formed from a gas.

7. The two-dimensional photonic crystal according to claim 6, characterized in that said dielectric material is a $BaO-TiO_2$ based dielectric material or $BaO-Nd_2O_3-TiO_2$ based dielectric material.

8. The two-dimensional photonic crystal according to claim 6, characterized by comprising a flat-plate shaped base, and a plurality of said first dielectric regions formed from a

dielectric material the same as that of said base and erected from said base.

9. The two-dimensional photonic crystal according to claim 1, characterized in that said photonic crystal comprises a second dielectric region surrounding said first dielectric region and having a dielectric constant different from that of said first dielectric region, and said first dielectric region and said second dielectric region are formed from dielectric materials having different dielectric constants.

10. The two-dimensional photonic crystal according to claim 9, characterized in that said first dielectric region and said second dielectric region are fired bodies.

11. The two-dimensional photonic crystal according to claim 9, characterized by comprising a flat-plate shaped base, a plurality of said first dielectric regions erected from said base and formed from a dielectric material the same as that of said base, and a second dielectric region surrounding said first dielectric region.

12. A two-dimensional photonic crystal in which first dielectric regions and second dielectric regions having a dielectric constant different from that of said first dielectric region are periodically disposed,

characterized in that the two-dimensional photonic crystal comprises:

said first dielectric regions each being columnar and having a rectangular cross section; and

said second dielectric regions each surrounding said first dielectric region,

a line segment Lx linking centers of two of said first dielectric regions adjoining in an X direction and a line segment Ly linking centers of two of said first dielectric regions adjoining in a Y direction orthogonal to said X direction are substantially orthogonal to each other substantially at their midpoints,

the ratio between the length x3 of said line segment Lx and the length y3 of said line segment Ly equals 1:substantially $\sqrt{3}$, and the ratio between the length x3 of said line segment Lx and the length x2 of said first dielectric region in said X direction and the length y2 in said Y direction equals 1:0.133:0.48 to 1:0.158:0.58.

13. The two-dimensional photonic crystal according to claim 12, characterized in that the ratio of x3:x2:y2 equals 1:0.135:0.48 to 1:0.150:0.54.

14. The two-dimensional photonic crystal according to claim 12, characterized in that the ratio of x3:x2:y2 equals 1:0.135:0.52 to 1:0.140:0.54.

15. The two-dimensional photonic crystal according to claim 12, characterized in that one of said first dielectric region

and said second dielectric region is formed from a dielectric material, and the other is formed from a gas.

16. The two-dimensional photonic crystal according to claim 12, characterized in that said first dielectric region and said second dielectric region are formed from dielectric materials having different dielectric constants.

17. The two-dimensional photonic crystal according to claim 1 or 12, characterized in that said two dimensional-photonic crystal has a full band gap width of 20.0% or greater.